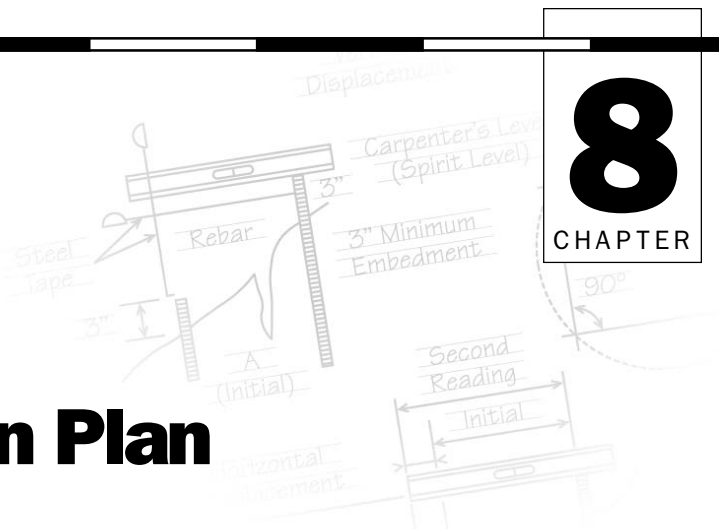


Chapter 8: Guidelines for an Emergency Action Plan



8.0 General

The primary goal of the state's dam safety program is to reduce the risk to lives and property from the consequences of dam failure. Although most dam owners have a high level of confidence in the structures they own and are certain their dams will not fail, history has shown that on occasion dams do fail and that often these failures cause extensive property damage—and sometimes death. A dam owner is responsible for keeping these threats to a minimum. A carefully conceived and implemented emergency action plan (EAP) is one positive step you, the dam owner, can take to accomplish dam safety objectives and to protect your investment and reduce potential liability.

An emergency action plan is not a substitute for proper maintenance or remedial construction, but it facilitates recognition of dam-safety problems as they develop and establishes nonstructural means to minimize risk of loss of life and reduce property damage. A plan is essential for dams which have a high-hazard potential and should also be prepared for significant hazard dams. The guidelines explained herein are for the purpose of defining the requirements of an acceptable emergency action plan and for facilitating its preparation, distribution, annual testing and update.

Make use of the portions of these guidelines that apply to your own dam. The Texas Dam Safety Program has

prepared separate outlines of an EAP for small, intermediate, and large dams.

Submit a draft copy of the plan to the Texas Dam Safety Program for review prior to final publication at the following address:

Dam Safety Program, MC 174
Texas Commission on
Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087
Telephone: 512 -239-5195

It is recommended that the plan be kept in a three-ring binder, for simplicity of updating, as it will allow the quick and easy replacement of revised pages and the removal of obsolete ones.

8.1 Contents of Guidelines

An EAP should contain:

- title page
- table of contents
- statement of purpose
- description of project
- notification flowchart
- emergency detection, evaluation, and classification
- responsibilities
- preparedness
- inundation maps
- implementation

8.2 Title Page

The title page shall identify the document as an EAP and specify the dam

for which it is developed. Include the owner's name and the inventory number for the dam.

8.3 Table of Contents

The table of contents should list all major items, including any appendixes for notification flowcharts, tables, and inundation maps.

8.4 Purpose

The purpose of an emergency action plan is to provide a systematic means to:

- Identify emergency conditions threatening a dam.
- Expedite effective responses to prevent failure.
- Prevent or reduce loss of life and property damage should failure occur.

This purpose should be stated concisely in the EAP.

8.5 Description of Project

A description of the project and its location shall include:

- a project or vicinity map;
- a drawing showing the project features;
- any significant upstream or downstream dam; and
- downstream communities potentially affected by a dam failure or by flooding as a result of large operational releases.

8.6 Notification Flowchart

A notification flowchart should identify who is to be notified, by whom, and in what order.

As owner, it is your responsibility to identify distress conditions at the dam and to notify all affected political jurisdictions and appropriate state and federal agencies of the condition and its possible consequences.

It is normally the responsibility of local governments, upon receiving such notification, to warn the public, make recommendations about evacuation, and offer shelter to area residents. There are instances, however, when the dam owner should more appropriately warn certain individuals instead of, or in addition to, relying on local government officials, particularly with small dams that may only affect a few people.

Prompt emergency notification requires:

- the identification of all affected jurisdictions
- the development and annual (or more frequent) updating of names, telephone numbers, call signs, and radio frequencies of individuals and agencies to contact; and
- the development of primary and alternate procedures for notification or warning regardless of time of day, day of the week, or weather.

When developing the notification flowchart, call the following parties to determine the appropriate contacts and phone numbers for key agencies that need to be notified in the event of an emergency:

- Governor's Division of Emergency Management, Department of Public Safety
Frank Cantu
512-424-2455

- National Weather Service
Ben Weiger
817-978-1100 x 118
- TCEQ's Dam Safety Program
Warren D. Samuelson, P.E.
512-239-5195

In the event that an emergency condition is declared at a dam, you, the owner, or the operator will initiate emergency notification. As far as possible, use the existing communication and warning systems operated by the Texas Department of Public Safety and local governments.

Develop information on potential inundation areas as described in Section 8.10.

The notification element of an emergency action plan should be brief, simple, and easy to implement under any conditions. Sample notification messages and sample public affairs news releases are attached as Tables 8.1 and 8.2 respectively. Use the appropriate notification message when contacting key officials about an emergency condition at a dam.

8.7 Emergency Detection, Evaluation, and Classifications

The EAP should indicate procedures for timely and reliable detection, evaluation, and classification of an existing or potential emergency situation, listing the conditions, events, or measures for detection of an existing or potential emergency. Incorporate an assessment of the dam, including its vulnerability to all appropriate known emergency conditions such as severe thunderstorms with lightning and excessive rains, hurricanes, tornadoes, earthquakes, etc., as well as a listing and explanation of problem indicators.

As owner, you are responsible for regularly monitoring the condition of your dam and correcting any deficiencies. The plan must include a routine inspection schedule

and name the person or position responsible for the inspection; it should emphasize indicators of the onset of problems that might cause failure of the dam:

- slumping, sloughing, or slides on the dam or the abutment
- cloudy or dirty seepage or seepage with an increase in flow, boils, piping, or bogs
- seepage around conduits
- cracks, settlement, misalignment, or sinkholes
- erosion or riprap displacement
- animal burrows, especially those associated with beavers or nutria
- growth of trees and brush
- failure of operating equipment
- abnormal instrumentation readings
- leakage of water into the intake tower
- undermining of spillways
- overtopping of the dam

The plan must address what action to take and what resources will be used when one of these indicators is observed and how quickly you or your responsible agent is to report the problem. Keep records relating to any of the indicators listed above to determine if changes are occurring. This will permit an intelligent assessment of the problems and the proper implementation of the emergency action plan. However, if you determine that failure is at all possible, report the situation immediately to the Texas Dam Safety Program and immediately implement all applicable notification procedures and emergency actions.

8.8 Responsibilities

The EAP is to identify:

- who is responsible for accomplishing each of the required emergency actions so as to meet all plan requirements;
- who is in charge of emergency response actions;
- communication and coordination channels;

- the location of the command post, control room, or emergency operating center; and
- lines of succession and assumptions of responsibility necessary to ensure uninterrupted emergency-response actions under any conditions.

8.9 Preparedness

The EAP should identify ways of preparing for an emergency, of increasing response readiness in a uniform and coordinated manner, and helping to reduce the effects of a dam failure. The goal is maximum readiness to respond in a minimum amount of time.

Categorize potential emergencies into phases or conditions and identify specific actions to reduce the possibility of either underreacting or overreacting to a given situation. List anticipated failure situations and appropriate responses, such as:

- **Emergency Water Release**—The release of water at the dam to lower lake levels is a normal procedure. An emergency release (i.e., in excess of normal) could flood certain downstream areas.
- **Watch Condition**—A problem has been detected at the dam which requires constant monitoring or immediate action to repair or correct. At this time, the distress condition is manageable by dam personnel. A watch condition will continue until the problem is corrected, or a possible-dam-failure warning is issued.
- **Possible-Dam-Failure Warning**—A watch condition that is progressively getting worse. Efforts to correct the situation will continue but a possibility now exists that the dam could fail if these efforts are unsuccessful. There is no immediate danger; however, if conditions continue to deteriorate, the dam could fail.

- **Imminent-Dam-Failure Warning**—You (the owner) or the operator has determined that conditions will progress to failure of the dam and an uncontrollable release of the reservoir. The dam will most likely fail regardless of what immediate measures are taken.
- **Dam Failure**—The dam has failed and a flood wave is now moving downstream. Flooding will start immediately and will continue to move downstream until water levels at the reservoir are stabilized. Massive destruction can be expected from the flood wave and evacuation of downstream areas should continue in accordance with local plans.

The EAP should also identify:

- support capabilities, such as personnel or organizations that can provide assistance and the procedures for contacting them;
- the existence and location of supplies and equipment available for use in remedial actions;
- procedures for emergency purchase or procurement of supplies and equipment needed for remedial actions; and
- remedial construction and other activities to prevent a failure of the dam.

8.10 Inundation Maps

Inundation maps showing potential areas of flooding from a dam failure are essential in local warning and evacuation planning and must be included with the emergency action plan. The inundation maps shall delineate areas that would be flooded as a result of a dam failure and shall include the time to flood (the time from the breach to the time that critical structures are flooded) and the time to peak flow. Contact the Texas Dam Safety Program for details of preparing these maps.

USGS 1:24,000 maps are generally suitable, though often out of date in the

structures and major infrastructure they depict. Aerial photographs, if available with reasonable clarity and scale, can also be used as a background for inundation maps. Topographic and aerial maps for Texas can be found online at the Texas Natural Resource Information Service, <www.tnris.state.tx.us>.

8.11 Implementation

After completing the plan, take steps to implement it. Supply copies of the completed plan to the TCEQ and other appropriate officials. The local National Weather Service office should receive a copy of the inundation maps to allow development of customized watch and warning messages. Schedule briefings with local officials to facilitate the incorporation of planning information into local-government emergency management plans.

Next, schedule training for the employees associated with the dam to familiarize them with the plan. Address:

- how to use the plan
- how to identify problems and their severity
- how to use the notification procedures and the communications equipment
- what resources are available
- the importance of employees' roles during emergencies
- the importance of updating downstream information

Also, develop a drill that rehearses the plan in an exercise. Schedule exercises yearly to keep employees familiar with the plan and to eliminate any potential problems. Coordinate with state and local officials before any test of the plan.

Conduct a *tabletop exercise* at least once every five years in the form of a meeting between you, the owner, and state and local emergency-management officials in a conference room. Begin the exercise

with a description of a simulated event and proceed to discussions among the participants to evaluate the EAP and response procedures, and to resolve concerns about coordination and responsibilities.

An annual review and evaluation of the plan is recommended. At that time, update the notification procedures to include any changes in names and telephone numbers of staff, local officials,

and downstream residents, and include any new problems. Submit revisions to the plan to the TCEQ and appropriate state and local government officials.

Table 8.1
Sample Notification Messages

A. **EMERGENCY WATER RELEASE.** This is a message about a dam emergency. (owner's name) at (name of dam) Dam, Texas, ID TX____, (has/have) declared a need for an emergency water release. There is no immediate danger of the dam failing. Releases to lower the lake level (began/will begin) at (time/date). (Minor) flooding is expected along the (stream name). (Briefly describe the problem/reason). For verification, call the phone numbers listed on page ___ of the flood-emergency plan for the (name of dam) Dam. Additional information will be provided as it becomes available.

B. **WATCH CONDITION.** This is a message about a dam emergency. (owner's name) at (name of dam) Dam, located at (approximate location), Texas, ID TX____, (has/have) declared a watch condition. (Briefly describe the problem/reason.) There is no immediate danger of the dam failing; however, the potential for failure does exist. Emergency water releases to lower the lake level (are / are not) planned. Request you initiate appropriate emergency management procedures. For verification, call the phone numbers listed on page ___ of the flood-emergency plan for the (name of dam) Dam. Additional information will be provided as it becomes available.

C. **POSSIBLE DAM FAILURE WARNING.** This is a message about a dam emergency. (owner's name) at (name of dam) Dam, located at (approximate location), Texas, ID TX____, (has/have) declared a possible dam failure warning condition. (Briefly describe the problem/reason.) There is a possibility that the dam could fail. Attempts to save the dam are under way, but their success cannot be determined as yet. Emergency water releases to lower the lake level (are / are not) planned. Request you initiate emergency management procedures and prepare for evacuation of threatened areas. If (name of dam) Dam fails, flooding will occur along the (stream name). For verification, call the phone numbers listed on page ___ of the flood-emergency plan for the (name of dam) Dam. Additional information will be provided as it becomes available.

D. **IMMINENT DAM FAILURE WARNING.** Urgent! This is a message about a dam emergency. The (name of dam) Dam, located at (approximate location), is in imminent danger of failing. Attempts to save the dam will continue, but their success is considered unlikely. Request you initiate emergency management procedures and begin evacuation of threatened areas. It is probable that the dam will fail in (number) hours. If (name of dam) Dam fails, a flood wave will move down the (stream name), through (cities), and on down the (stream name). For verification, call the phone numbers listed on page ___ of the flood-emergency plan for the (name of dam) Dam.

E. **DAM FAILURE MESSAGE.** Emergency! This is an emergency message about a dam failure. This is (owner's name). (name of dam) Dam, located at (approximate location), has failed. A flood wave is now moving down the (stream name) and the peak will reach (list prominent points and the time to reach them). Evacuate threatened areas immediately. For verification, call the phone numbers listed on page ___ of the flood-emergency plan for the (name of dam) Dam.

Table 8.2
Sample News Release

Note: Coordinate with the Texas Department of Public Safety prior to release.

- A. **ANNOUNCEMENT FOR EMERGENCY WATER RELEASE.** (owner's name) at (name of dam) declared a need for emergency water releases to lower the lake level. (Briefly describe the problem/reason.) There is no immediate danger of the dam failing. Releases of (volume) cubic feet per second (began/will begin) at (time/date). (Minor) flooding is expected along the (stream names).
- B. **ANNOUNCEMENT FOR SLOWLY DEVELOPING WATCH CONDITION.** (owner's name) declared a watch condition at (name of dam) Dam as of (time and date). (Describe the problem.) There is no immediate danger of the dam failing; however, the potential does exist. (Describe what actions are being taken to monitor/control the situation.) (State how much, if any, water releases are being made.)
- C. **ANNOUNCEMENT FOR POSSIBLE DAM FAILURE WARNING CONDITION.** (owner's name) declared a possible dam failure warning condition at (name of dam) Dam as of (time and date). (Describe the problem.) There is a possibility that the dam could fail. Attempts to save the dam are under way, but their success cannot be determined as of yet. (Describe what actions are being taken to monitor/control the situation.) (State how much, if any, water is being released.) Additional news releases will follow as information is received.
- D. **ANNOUNCEMENT FOR IMMINENT FAILURE WARNING CONDITION.** Urgent! (owner's name) announced at (time and date) that (name of dam) Dam is in imminent danger of failing. (Describe the problem.) Attempts to save the dam will continue, but their success is considered unlikely. (Describe what actions are being taken to monitor/control the situation.) It is probable that the dam will fail in (number) hours. Residents of (city) and other low areas along the (stream names) should prepare for immediate evacuation. Additional news releases will follow as information is received.
- E. **ANNOUNCEMENT OF A DAM FAILURE.** Emergency! (Name of dam) Dam failed at (time and date). Residents who have not yet evacuated should immediately evacuate low areas along the (list prominent points and the time to reach them). Additional news releases will follow as information is received.